TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during June, 1925*

TEMPERATURE (° C.)

Altitude, m. s. l. (meters)	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (225 m.)	
	Mean	Departure from 7-yr. mean	Mean	Departure from 10-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 7-yr. mean	Mean	Departure from 7-yr. mean
Surface	27.9	+2.6	22.2	+0.7	28.7	+1.8	17.6	−1.6	28.1	+2.0	23.9	+0.6
250	27.7	+2.5			28.2	+1.7			26.9	+1.8	23.5	+0.5
500	25.6	+2.4	21.3	+0.5	25.2	+1.4	17.1	−1.8	24.4	+1.3	20.4	+0.1
750	24.0	+2.4	20.0	+0.7	23.3	+1.4	15.5	−1.8	22.7	+1.1	18.5	+0.2
1,000	22.3	+2.0	18.6	+0.6	21.5	+1.2	14.1	−1.8	21.2	+0.8	16.7	0.0
1,250	20.5	+1.5	17.4	+0.7	19.6	+1.0	12.8	−1.8	19.9	+0.7	14.9	−0.2
1,500	19.1	+1.5	16.1	+0.7	17.7	+0.9	11.8	−1.5	18.5	+0.5	13.5	−0.2
2,000	16.3	+1.6	13.8	+1.1	14.0	+0.6	9.5	−1.0	16.8	+1.1	10.4	−0.6
2,500	13.4	+1.5	10.9	+1.2	10.7	+0.6	6.9	−0.8	14.8	+1.6	7.1	−1.1
3,000	10.4	+1.6	8.0	+1.3	6.8	−0.3	4.4	−0.5	12.3	+1.7	3.7	−1.7
3,500	7.3	+1.7	4.8	+1.3	3.4	−0.6	1.5	−0.5	10.1	+2.1	1.1	−1.6
4,000	4.1	+1.6	2.0	+1.7			−1.2	−0.4	7.9	+2.6		
4,500	1.2	+1.7	−0.8	+1.8			−3.5	+0.4	5.1	+2.8		
5,000	−1.8	+1.4	−3.8	+1.9					2.4	+3.6		

RELATIVE HUMIDITY (*per cent*)

Surface	57	−14	68	−2	54	−7	74	+3	64	−9	62	−2
250	57	−14			54	−7			67	−7	62	−2
500	59	−13	68	0	56	−7	73	+3	73	−3	64	−1
750	61	−11	64	−1	58	−6	69	+1	74	−1	65	+1
1,000	63	−8	63	−1	61	−4	68	+1	71	0	66	+1
1,250	66	−4	62	−1	64	−2	67	+1	68	+1	66	0
1,500	64	−4	61	0	67	0	63	−1	67	+4	64	−1
2,000	57	−6	57	−1	69	0	61	−1	53	−2	69	+7
2,500	52	−5	57	+1	64	−4	60	+1	44	−7	67	+14
3,000	49	−4	50	−4	70	+4	57	+2	40	−7	71	+21
3,500	47	−5	50	−3	74	+10	54	+3	29	−15	48	+5
4,000	49	−1	50	−2			54	+7	25	−18		
4,500	48	+1	51	+1			40	−6	24	−22		
5,000			51	−1					23	−23		

VAPOR PRESSURE (*md.*)

Surface	21.34	−1.56	18.28	+0.31	20.69	−0.58	15.17	−1.02	23.69	−0.76	18.25	−0.18
250	21.18	−1.52			20.19	−0.72			23.31	−0.27	17.78	−0.35
500	19.59	−0.77	17.29	+0.43	17.53	−1.02	14.58	−1.10	21.96	+0.38	14.97	−0.76
750	18.06	−0.32	15.07	+0.37	16.20	−0.70	12.45	−1.26	20.18	+0.67	13.71	−0.64
1,000	16.88	+0.20	13.64	+0.28	15.09	−0.44	11.14	−1.20	17.71	+0.64	12.85	−0.36
1,250	15.67	+0.78	12.47	+0.36	14.15	−0.12	10.09	−1.03	15.78	+0.76	11.83	−0.29
1,500	13.97	+0.78	11.45	+0.65	13.30	+0.26	8.84	−1.03	14.35	+1.24	10.58	−0.27
2,000	10.57	+0.43	9.08	+0.44	11.05	+0.32	7.35	−0.62	10.30	+0.33	9.51	+1.07
2,500	7.98	+0.51	7.55	+0.64	8.30	−0.18	6.17	−0.28	7.71	−0.18	7.48	+1.72
3,000	6.14	+0.56	5.46	−0.09	6.72	+0.15	5.07	+0.13	6.20	−0.12	5.64	+1.50
3,500	4.94	+0.52	4.21	−0.22	5.22	+0.18	3.94	+0.01	4.36	−0.75	3.06	+0.47
4,000	4.04	+0.56	3.55	−0.03			3.21	0.00	3.76	−0.52		
4,500	3.76	+0.98	3.00	+0.20			1.91	−0.64	3.53	−0.29		
5,000			2.54	+0.18					3.35	−0.03		

THE WEATHER ELEMENTS

By P. C. DAY, In Charge of Division

PRESSURE AND WINDS

The atmospheric circulation during the month, as disclosed by the chart of average sea-level pressure, assumed the usual summer type in the main—high pressure over the Southeastern States, moderately low values over the interior, and again high pressure along the Pacific coast. These conditions were accentuated, however, in each locality as compared with normal conditions; and notably the southeastern high was maintained with unusual strength and persistence during the first decade, resulting in an unusually long period of southerly winds, high temperatures, and lack of precipitation over the eastern third of the country. At the same time pressure was distinctly lower than normal over the central and southern Rocky Mountain and Plateau regions and thence northeastward to the Great Lakes. Numerous cyclones, usually of small proportions, however, formed over the Southwest, and unable to overcome the anticyclonic area overlying the Southeastern States, moved toward the upper lakes, bringing an usually large number of rainy days to the Missouri and upper Mississippi Valley districts, and much cool, cloudy weather throughout the Northwest.

The early part of the month likewise had generally low pressure over the Pacific Coast States, and cool, cloudy weather resulted, with usually more than the average precipitation in the far Northwest and in portions of California.

During the last half of the month pressure conditions were largely reversed. Anticyclones became more numerous over the far Northwest, temperatures increased, and a period of unusually dry atmospheric conditions prevailed. Low pressure was still more or less persistent along the Canadian border, and rather frequent showers continued in the Northern States east of the Rocky Mountains. At the same time the atmospheric circulation over the Southeastern States became less stable, weather changes were more frequent, with a decided tendency to moderate temperatures, and local showers relieved to some extent the need for moisture.

The high pressure over the Southeastern States during the early part of the month favored persistent southerly

TABLE 2.—*Free-air resultant winds (m. p. s.) during June, 1925*

Altitude, m. s. l. (meters)	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		7-year mean		Mean		10-year mean		Mean		5-year mean		Mean		8-year mean		Mean		7-year mean		Mean		7-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 7°W.	7.4	S. 4°W.	4.4	S. 2°E.	3.0	S.	0.1	S. 51°W.	2.4	S. 75°W.	1.1	N. 47°W.	1.6	S. 30°W.	0.1	S. 2°W.	4.7	S. 5°E.	3.4	S. 55°W.	2.2	S. 54°W.	1.4
250	S. 8°W.	7.4	S. 5°W.	4.5					S. 49°W.	2.2	S. 76°W.	1.2					S. 3°W.	5.1	S. 4°E.	4.0	S. 37°W.	2.4	S. 48°W.	1.5
500	S. 13°W.	8.6	S. 10°W.	5.8	S. 2°E.	3.6	S. 2°E.	2.3	S. 65°W.	2.8	S. 77°W.	1.9	N. 61°W.	1.3	S. 31°W.	0.1	S. 7°W.	5.9	S. 1°W.	5.4	S. 49°W.	4.5	S. 48°W.	2.6
750	S. 17°W.	8.8	S. 14°W.	6.5	S. 13°W.	5.2	S. 10°W.	3.5	S. 65°W.	3.0	S. 74°W.	2.5	N. 85°W.	1.2	S. 12°W.	0.9	S. 6°W.	6.3	S. 4°W.	5.8	S. 49°W.	6.2	S. 53°W.	3.5
1,000	S. 21°W.	8.6	S. 20°W.	6.6	S. 19°W.	6.1	S. 24°W.	4.0	S. 79°W.	3.1	S. 78°W.	2.5	N. 78°W.	1.7	S. 26°W.	1.3	S. 3°W.	6.6	S. 8°W.	6.2	S. 58°W.	7.5	S. 67°W.	4.3
1,250	S. 27°W.	8.7	S. 26°W.	6.7	S. 28°W.	6.9	S. 34°W.	4.3	S. 89°W.	3.1	S. 82°W.	3.0	N. 85°W.	2.3	S. 49°W.	2.0	S. 4°W.	6.7	S. 9°W.	6.5	S. 59°W.	8.9	S. 72°W.	4.9
1,500	S. 27°W.	8.8	S. 30°W.	6.8	S. 37°W.	7.2	S. 48°W.	4.8	W.	3.7	S. 86°W.	3.8	W.	3.0	S. 54°W.	2.4	S. 4°W.	6.8	S. 10°W.	6.0	S. 70°W.	6.0	S. 82°W.	4.8
2,000	S. 25°W.	8.2	S. 35°W.	6.7	S. 49°W.	9.7	S. 57°W.	6.1	S. 81°W.	4.4	S. 88°W.	5.7	N. 89°W.	4.5	S. 65°W.	3.6	S. 6°W.	6.6	S. 12°W.	5.6	S. 79°W.	10.5	S. 82°W.	7.5
2,500	S. 29°W.	8.1	S. 36°W.	6.9	S. 66°W.	9.9	S. 70°W.	7.5	S. 72°W.	3.8	S. 87°W.	5.8	S. 71°W.	5.9	S. 71°W.	5.4	S. 1°W.	6.2	S. 14°W.	5.5	S. 69°W.	12.2	S. 80°W.	9.1
3,000	S. 28°W.	7.5	S. 37°W.	6.5	S. 73°W.	10.5	S. 76°W.	8.9	S. 80°W.	8.2	S. 88°W.	7.9	S. 71°W.	8.2	S. 78°W.	7.5	S. 4°W.	5.8	S. 16°W.	5.5	S. 67°W.	11.5	S. 82°W.	10.4
3,500	S. 42°W.	5.1	S. 44°W.	6.7	N. 84°W.	12.6	S. 81°W.	9.5	S. 85°W.	11.7	S. 83°W.	9.0	S. 81°W.	10.1	S. 80°W.	9.3	S. 5°E.	6.6	S. 9°W.	5.8	S. 37°W.	8.7	S. 84°W.	11.1
4,000	S. 85°W.	6.2	S. 60°W.	7.1	N. 86°W.	10.7	N. 85°W.	9.0					S. 78°W.	13.2	S. 85°W.	11.6	S. 23°E.	7.0	S. 8°W.	6.4				
4,500	N. 72°W.	8.6	S. 88°W.	8.0	S. 78°W.	12.4	N. 79°W.	9.0					S. 62°W.	15.1	N. 88°W.	12.7	S. 45°E.	10.1	S. 12°E.	8.2				
5,000	W.	13.0	N. 73°W.	12.4	N. 84°W.	12.3	N. 58°W.	16.1					S. 45°W.	16.0	N. 74°W.	14.6	S. 67°E.	10.0	S.	3.8				

winds in most districts from the Rocky Mountains eastward during that period, and with occasional favorable conditions for such winds thereafter, the prevailing directions for the month were mainly southerly over the eastern two-thirds of the country. No extensive severe storms occurred during the month, though local high winds and hailstorms were numerous, and caused much damage to crops and otherwise in the aggregate, particularly in Iowa and adjoining States. The loss of human life, however, appears to have been moderately small, though a considerable number of persons were more or less injured. The usual details concerning the severe storms of the month appear at the end of this section.

TEMPERATURE

The outstanding weather features were the long heated period over the more eastern districts during the first decade, and the similar conditions experienced in the far West about the middle of the last decade.

At the beginning of the month pressure was increasing over the Southeastern States, and a cyclone of considerable proportions had overspread the Dakotas, thereby inducing southerly winds over much of the eastern half of the country. This pressure distribution continued without material interruption during nearly the entire first decade, though the conditions were most favorable for intense heat from about the 4th to 6th over the Great Lakes, Ohio Valley, and thence eastward, where the day temperatures were in many localities the highest ever observed in June, and at others the highest so early in the season. From the 1st until about the 9th or 10th the temperatures over this region were almost constantly far above normal, and in some of the more eastern and northern sections the period as a whole was the hottest ever experienced so early in the summer, the departures from the normal ranging from +10° in portions of the Southern Plains to +15° or more locally in the Great Lakes region and the North Atlantic States.

During portions of this period high humidity existed and many prostrations and deaths resulted in the congested districts of the larger cities.

Over the western districts the period was moderately cool, the lowest temperatures of the month occurring in all the States from the Great Plains westward.

From the 10th to the 16th temperatures continued moderately high from the southern Plains northeastward to New England, but occasional changes to cooler brought much relief. Over most western and northwestern districts this period continued moderately cool.

For the period 16th to 23d temperatures were mainly above normal over the greater part of the country, though not oppressively so save in some interior sections from the middle Plains eastward and in the far West, where the averages ranged from 6° to 10° or more above normal. In parts of California and adjacent States decidedly warm weather set in toward the latter part of the period, some stations in northern California reporting the highest temperatures ever observed in June.

The last week of the month continued unusually warm over the far West, stations in central and northern California and generally in Oregon and Washington reporting not only the highest temperatures ever observed in June but the highest observed in any month during the past 50 years. This week was moderately cool over all districts from the Missouri Valley to the Atlantic coast, a few points in the Lake region having the lowest temperatures ever observed so late in the season.

The average temperatures for the month returned mainly to the above-normal conditions that have continued so persistently during the present year so far, except for May, the month being particularly warm from the middle and southern Plains eastward to the coast. In many of the Atlantic coast districts the monthly means were higher than any previous June of record, while in portions of the Ohio Valley they were the highest save for 1914. In the southern Plains the monthly means were locally the highest for June, or the highest except for June, 1911.

Maximum temperatures reached 100° or more in practically all the States, the highest observed, 123°, occurring in California, though 117° was observed in Arizona, 113° in Idaho, 112° in Nevada, and 110 in Oregon, Washington, Kansas, and Texas.

Minimum temperatures were below freezing at exposed points near the end of the month in all the northern border States from the Dakotas eastward. In the western districts and along the immediate Gulf and south Atlantic coast districts they were usually lowest during the first few days of the month.

PRECIPITATION

As has been the case for a number of months, precipitation was deficient and more or less scanty over the Atlantic and Gulf Coast States, portions of the lower Lake region and Ohio Valley, and in the southern Plains.

The first decade was mainly without beneficial rains from Oklahoma and Texas eastward to the Atlantic coast, and portions of the Ohio Valley and Middle Atlantic States also had but little. Over the northern districts this period had rather frequent showers; in fact, in portions of the Dakatos and adjacent States showers occurred almost daily and they were rather frequent in the western Mountain districts and the Pacific Coast States from northern California to Washington.

During the second decade frequent rains continued over many northern sections and extended southward into the middle Mississippi Valley, and local showers occurred in many eastern and southern districts. During this period some local heavy rains occurred, notably at Galveston, Tex., where on the 12th more than 10 inches fell in a comparatively short period, the heaviest rain by far recorded at that station in June, a rather peculiar feature of this storm being the limited area over which the rain was unusually heavy. On the 14th and 15th remarkably heavy rains occurred over northeastern Iowa; at Dubuque the fall was among the heaviest of record in 50 years. Much damage resulted from washing, flooding, etc.

The last decade had scattered showers over many districts, and most States from the Missouri Valley eastward had sufficient for present needs. In portions of the West Gulf and Southern Plains States there was little beneficial rain, and drought was becoming severe.

For the month as a whole and considering the entire country there was a considerable deficiency in precipitation, as had been the case in practically all the months of the present year. In general all States east of the Mississippi River had deficient rainfall, except the extreme Northeast and the sections bordering on the upper portions of that river. There was also a general and important lack of precipitation in the West Gulf and Southern Plains States and in the far Northwest. In portions of central and western South Carolina the month was among the driest of record for June, and similar conditions existed in portions of the lower Mississippi Valley, notably in western Tennessee and northern Louisiana,

where rainfall has been remarkably deficient for six months or more.

In large portions of Texas the month was without material rainfall, while in New Mexico severe drought for many months past still continued. At Roswell, N. Mex., the continued lack of rain had resulted in lowering the flow of water from artesian wells to unprecedented levels, and where they normally flowed spontaneously it has become necessary to resort to pumping and even that failed in many wells. Also at other points in that State the diminishing water supply was becoming serious.

On the other hand, precipitation was unusually heavy in the upper Mississippi Valley and portions of the Dakotas and adjacent States, and there was a general excess to the westward as far as the Plateau States and over California and Arizona. At a few points the monthly precipitation was the greatest of record, notably at Charles City, Iowa, while at other points in the northeastern portion of that State it was equal to or greater than had been previously recorded in June.

SNOWFALL

As far as available reports indicate, no snow occurred during the month east of the Rocky Mountains. In the high elevations of those mountains amounts up to 10 or 12 inches occurred, mostly in Colorado, Wyoming, and Montana, while light snows fell at points in the high mountains of California and Arizona.

RELATIVE HUMIDITY

Over nearly all central and eastern districts there was a general deficiency in the relative humidity, the negative departures from the normal being usually quite large from the southern Plains northeastward to the Appalachian Mountain region. In the Northern States from the Great Lakes to the Rocky Mountains there was a rather general excess of relative humidity, and similar conditions existed over many sections of the Rocky Mountain and Plateau States.

SEVERE LOCAL HAIL AND WIND STORMS, JUNE, 1925

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path, yard[1]	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Marlette, Mich. (near)	1					Tornado	Several farm buildings demolished	Official, U. S. Weather Bureau.
Bourne, Mass.	1					Hail	Glass in windows and hothouses broken	Do.
Tieton City, Wash.	1		2,640			do	Crops damaged	Do.
Mondovi, Wis.	1	4–5 p. m.	880			Heavy hail	Severe crop damage	Do.
Junction City, Kans.	1	4:30 p. m.	2,640		$20,000	Hail	Greenhouses and auto tops damaged; fruit and other crops injured.	Do.
Crawford County, Kans.	1	do			100,000	Tornado	Schoolhouse and several dwellings wrecked; orchards and wheat fields damaged. Heaviest losses in Wier and Scammon. Four persons injured.	Official, U. S. Weather Bureau; Daily Capital (Topeka, Kans.).
Iowa (parts of)	1–3			10	(2)	Series of tornadoes, rain, hail.	Crop and property losses extensive; many persons injured. Heavy damage in Sioux City.	Tribune (Sioux City, Iowa); Official, U. S. Weather Bureau.
Methow, Wash. (vicinity of)	2	10 a. m.	1,760		75,000	Hail	Apple crop loss heavy	Official, U. S. Weather Bureau.
Lakeside, Wash. (vicinity of)	2	do	3,520		20,000–25,000	do	Apple orchards damaged	Do.
Ionia, Mich. (near)	2	P. m.				Small tornado	Several barns, silos, and outbuildings wrecked; trees uprooted; houses moved from foundations. One person injured.	Free Press (Detroit, Mich.).
Minneapolis, Minn., and vicinity.	2	do		5		High wind	Building demolished; trees uprooted; a number of lives lost and a score of persons injured.	Official, U. S. Weather Bureau.
Madison County, Nebr. (South part of).	2	3 p. m.		3	$200,000–250,000	Tornado	Buildings on three farms completely destroyed, others damaged; 100 head of cattle, 25 horses, and thousands of chickens killed. Much crop damage over path 4 miles long.	Do.
Otoe and Cass Counties, Nebr.	2	3:30 p. m.	440–880		200,000	do	Everything in path wrecked; path 30 miles long; livestock killed.	Do.
McPherson County, Kans.	2	3–4 p. m.	16–33		65,000	do	Damage chiefly to telephone lines and barns.	
Riley and Pottawatomie Counties, Kans.	2	5 p. m.	50–100		35,000	do	Property and crops damaged; heaviest loss at Garrison.	Do.
Clark County, Wis. (southwest part of).	2	10:30 p. m.	65–100		30,000	do	Loss mainly to farm buildings; some damage to orchards and crops over path 20 miles long.	Do.
Brule, Wis.	3	1 a. m.		1	2,500	Probably small tornado.	Amount and character of damage not reported	Do.
St. Joseph, Mo., and vicinity.	3	A. m.			500,000	Rain and wind	Heavy damage in city by flooding; considerable crop destruction; many bridges washed out.	Do.
Ludington, Mich., and vicinity.	3	11 p. m. midnight.				Thunderstorm	Buildings north and east of city damaged by lightning.	Do.
Omaha, Nebr.	3					Thunderstorm and tornadic wind.	Roofs and porches damaged; small house moved from foundation.	Do.
Artesia, N. Mex. (near)	4	5:05–5:15 p. m.	880–1,760			Severe hail	Much glass broken	Do.
Manning, S. C. (near)	5	P. m.			9,000	Electrical and hail.	Church damaged at Jordan; barn destroyed; considerable crop loss.	Do.
Parke County, Ind. (east part of).	6				4,000	Electrical	Two barns destroyed	Do.
Wray, Colo. (near)	6	1:30 p. m.	1,760		100,000	Tornado	Many homes and farm buildings destroyed; stock killed; trees and telephone lines prostrated; path 22 miles long; 6 persons seriously injured.	Do.
Rockport, Mo.	7	4 p. m.			7,000	Small tornado	Small outhouses, barns, and chimneys blown over; trees uprooted.	Do.
Ardmore, Okla. (near)	7	6 p. m.	100	1		Wind	One small residence demolished; two oil storage tanks moved; minor property damage.	Do.
Baltimore County, Md.	8	3 p. m.	1,760		16,000	Thunderstorm and hail.	Damage principally to crops; tents of military camp blown down; trees uprooted; home under construction wrecked.	Do.
Cumberland, Md.	8	7 p. m.			25,000	Electrical and heavy rain.	Heavy damage by rain	Do.
Mechanicsville, Md. (near)	8			1		Electrical	Several buildings damaged; 2 horses killed	Do.
Niles, Ohio	8					Wind and rain	Roofs blown off; box cars lifted from tracks; streets impassable.	Do.

[1] Yards when not otherwise specified. "Mi." signifies miles.

[2] See note for the entry below: "Iowa (parts of): 11."